Gene name: O1-180

cDNA sequence: 1276 bp

"AAGGCGGGCGAGGCGCGGGACGCACCCATGTTCCCGGCGAG
CACGTTCCACCCCTGCCCGCATCCTTATCCGCAGGCCACCAAAGCCGGGGATG
GCTGGAGGTTCGGAGCCAGGGGCTGCCGACCCGCGCCCCCCTCCTTCCTCCCC
GGCTACAGACAGCTCATGGCCGCGGAGTACGTCGACAGCCACCAGCGGGCAC
AGCTCATGGCCCTGCTGTCGCGGATGGGTCCCCGGTCGGTCAGCAGCCGTGA
CGCTGCGGTGCAGGTGAACCCGCGCCGCGACGCCTCGGTGCAGTGTTCACTC
GGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCCGAT
CGGGTTCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCGCGATC
CTGGCAGACCGTAGCCCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTC
ACTGGAGGTTGCGGGAGGCAGGCAGACACCCACGAAGGGAGAGGGGAGCCC
GGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGCGAGGAA
AGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGATGTTCAGGCTGCAGGGCA
GGCCGGGTGGGAGCAGCAGCCACCACCGGAGGACCGGAACAGTGTGGCGGC
GATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCCTGCCGCAGAGATGGCT
CAGGACCCCGGTGATTCGGATGCCCCTCGAGACCAGGCCTCCCCGCAAAGCAC
GGAGCAGGACAAGGAGCGCCTGCGTTTCCAGTTCTTAGAGCAGAAGTACGGCT
ACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCTATGTGTGGTGT
GTGCAGGGCACCAGTAAGGTGTTACTTCAAACAGTTCTGCCGAGTGTGTGAGAA
ATCCTACAACCCTTACAGAGTGGAGGACATCACCTGTCAAAGTTGTAAAAGAAC
TAGATGTGCCTGCCCAGTCAGATTTCGCCACGTGGACCCTAAACGCCCCCATC
GGCAAGACTTGTGTGGGAGATGCAAGGACAAACGCCTGTCCTGCGACAGCAC
CTTCAGCTTCAAATACATCATTTAGTGAGAGTCGAAAACGTTTCTGCTAGATGG
GGCTAATGGAATGGACAAGTGAGCTTTCTCCCCTCTTCACCTCTTCCCTTTCCAA
ATTCTTCATGACAGACAGTGTTACTTGGATATAAAGCCTGTGAATAAAAGGTAT
TGCAAACAAAAAAAAAAAAAAAAAA"

Figure 1

Amino Acid sequence: 361aa

"MFPASTFHPCPHPYPQATKAGDGWRFGARGCRPAPPSFLPGYRQLMAAEYVDS
HQRAQLMALLSRMGPRSVSSRDAAVQVNPRRDASVQCSLGRRTLQPAGCRASPDA
RSGSCQPRGHAGAGRSPRSWQTVAPFSSVTFCGLSSSLEVAGGRQTPTKGEGSPA
SSGTREPEPREVAARKAVPQPRSEEGDVQAAGQAGWEQQPPPEDRNSVAAMQSEP
GSEEPCPAAEMAQDPGDSDAPRDQASPQSTEQDKERLRFQFLEQKYGYYHCKDCK
IRWESAYVWCVQGTSKVYFKQFCRVCEKSYNPYRVEDITCQSCKRTRCACPVRFR
HVDPKRPHRQDLCGRCKDKRLSCDSTFSFKYII"

Figure 2

O1-184 cDNA sequence: 1817bp

GTCACAGCTTTCCCCTGCCCGAATATGGTGATCTGTCTCCATTGTCCAGATCA
GGATGATTCTTTAGAAGAAGTCACAGAGGAATGCTATTCCCCACCCACCCTC
CAGAACCTGGCAATTCAGAGTCTACTGAGGGATGAGGCCTTGGCCATTTCTG
CTCTCACGGACCTGCCCCAGAGTCTGTTCCCAGTAATTTTTGAGGAGGCCTTC
ACTGATGGATATATAGGGATCTTGAAGGCCATGATACCTGTGTGGCCCTTCCC
ATACCTTTCTTTAGGAAAGCAGATAAATAATTGCAACCTGGAGACTTTGAAG
GCTATGCTTGAGGGACTAGATATACTGCTTGCACAAAAGGTTCAAACCAGTA
GGTGCAAACTCAGAGTAATTAATTGGAGAGAAGATGACTTGAAGATATGGGC
TGGATCCCATGAAGGTGAAGGCTTACCAGATTTCAGGACAGAGAAGCAGCCA
ATTGAGAACAGTGCTGGCTGTGAGGTGAAGAAAGAATTGAAGGTGACGACT
GAAGTCCTTCGCATGAAGGGCAGACTTGATGAATCTACCACATACTTGTTGC
AGTGGGCCCAGCAGAGAAAAGATTCTATTCATCTATTCTGTAGAAAGCTACT
AATTGAAGGCTTAACCAAAGCCTCAGTGATAGAAATCTTCAAAACTGTACAC
GCAGACTGTATACAGGAGCTTATCCTAAGATGTATCTGCATAGAAGAGTTGG
CTTTTCTTAATCCCTACCTGAAACTGATGAAAAGTCTTTTCACACTCACACTA
GATCACATCATAGGTACCTTCAGTTTGGGTGATTCTGAAAAGCTTGATGAGG
AGACAATATTCAGCTTGATTTCTCAACTTCCCACACTCCACTGTCTCCAGAAA
CTCTATGTAAATGATGTCCCTTTTATAAAAGGCAACCTGAAAGAATACCTCAG
GTGCCTGAAAAAGCCCTTGGAGACACTTTGCATCAGTAACTGTGACCTCTCAC
AGTCAGACTTGGATTGCCTGCCCTATTGCCTGAATATTTGTGAACTCAAACAT
CTGCATATTAGTGATATATATTTATGTGATTTACTCCTTGAGCCTCTTGGTTTT
CTCCTTGAGAGAGTTGGAGATACCCTGAAAACCCTGGAATTGGATTCATGTT
GTATAGTGGACTTTCAGTTCAGTGCCTTGCTGCCTGCCCTAAGCCAATGTTCT
CACCTCAGAGAGGTCACTTTCTATGATAATGATGTTTCTCTGCCTTTCTTGAA
AACAACTTCTACACCACACAGCCCTGCTGAGTCAGCTGATCTATGAGTGTTAC
CCTGCCCCTCTAGAGTGCTATGATGACAGTGGTGTAATACTAACACACAGATT
AGAAAGTTTTTGTCCTGAGCTTCTGGATATACTGAGAGCCAAAAGACAGCTC
CATAGTGTCTCCTTTCAAACAACCAAATGCTCTAAATGTGGTGGGTGCTACAT
TTATGATCGGCATACCCAATGTTGCCGTTTTGTGGAACTACTATAAGCTTGAT
TGTGAAACTGAGAAATAGAAACTTAGTATTGGGGACTGATGAAATCCTAAGT
GAATGTCCACTGCTAAATGGAGCATGAAAATGTCAATCACCTAAAAGTCTGA
GATACACAGGAAAGTCAATAACTTCCTCTGAGCTGGTGAATGGATGTTGCAT
CTGTAGAAAGTATCAAGCACTTGTAGTTTGAATGTGTTACAATAGAAGCACC
ATTTTATGAGACTGGCCCAATCTGTTGACTGCATACAATAAATCTGTTGACTT
ATTAAATTTTTAAAAAAAAAAAAAAAAAAAAA

Figure 3

O1-184 amino acid sequence: 426 amino acids

MVICLHCPDQDDSLEEVTEECYSPPTLQNLAIQSLLRDEALAISALTDLPQSLFP
VIFEEAFTDGYIGILKAMIPVWPFPYLSLGKQINNCNLETLKAMLEGLDILLAQKV
QTSRCKLRVINWREDDLKIWAGSHEGEGLPDFRTEKQPIENSAGCEVKKELKV
TTEVLRMKGRLDESTTYLLQWAQQRKDSIHLFCRKLLIEGLTKASVIEIFKTVHA
DCIQELILRCICIEELAFLNPYLKLMKSLFTLTLDHIIGTFSLGDSEKLDEETIFSLIS
QLPTLHCLQKLYVNDVPFIKGNLKEYLRCLKKPLETLCISNCDLSQSDLDCLPYC
LNICELKHLHISDIYLCDLLLEPLGFLLERVGDTLKTLELDSCCIVDFQFSALLPAL
SQCSHLREVTFYDNDVSLPFLKTTSTPHSPAESADL

Figure 4

Gene name: O1-236

cDNA sequence: 1019bp

"GCCATATTGAGGACCTGCAGTAGAGGTGGAACCCATGACTGGCAGCGCAAAC
ACAGTGATAACAGCTGAGCTCCAAGCAAGGACCCAGGACCTTGCCTCACCACA
GACATAATCTTTCCCCACAACACCTCCACCAAGCCGCCCTGTAAATCGACATGA
GTCGCCACAGCACCAGCAGCGTGACCGAAACCACAGCAAAAAACATGCTCTGG
GGTAGTGAACTCAATCAGGAAAAGCAGACTTGCACCTTTAGAGGCCAAGGCGA
GAAGAAGGACAGCTGTAAACTCTTGCTCAGCACGATCTGCCTGGGGGAGAAAG
CCAAAGAGGAGGTGAACCGTGTGGAAGTCCTCTCCCAGGAAGGCAGAAAACC
ACCAATCACTATTGCTACGCTGAAGGCATCAGTCCTGCCCATGGTCACTGTGTC
AGGTATAGAGCTTTCTCCTCCAGTAACTTTTCGGCTCAGGACTGGCTCAGGACC
TGTGTTCCTCAGTGGCCTGGAATGTTATGAGACTTCGGACCTGACCTGGGAAG
ATGACGAGGAAGAGGAGGAAGAGGAGGAGGAAGAGGATGAAGATGAGGATG
CAGATATATCGCTAGAGGAGATACCTGTCAAACAAGTCAAAAGGGTGGCTCCC
CAGAAGCAGATGAGCATAGCAAAGAAAAAGAAGGTGGAAAAAGAAGAGGATG
AAACAGTAGTGAGGCCCAGCCCTCAGGACAAGAGTCCCTGGAAGAAGGAGAA
ATCTACACCCAGAGCAAAGAAGCCAGTGACCAAGAAATGACCTCATCTTAGCAT
CTTCTGCGTCCAAGGCAGGATGTCCAGCAGCTGTGTTTTGGTGCAGGTGTCCA
GCCCCACCACCCTAGTCTGAATGTAATAAGGTGGTGTGGCTGTAACCCTGTAAC
CCAGCCCTCCAGTTTCCGGAGGTTTTTGGTGAAGAGCCCCCAGCAAGTTCGCC
TAGGGCCACAATAAAATTTGCATGATCAGGAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAA"

Figure 5

Amino Acid sequence: 207aa

" MSRHSTSSVTETTAKNMLWGSELNQEKQTCTFRGQGEKKDSCKLLLSTICLGEK
AKEEVNRVEVLSQEGRKPPITIATLKASVLPMVTVSGIELSPPVTFRLRTGSGPVFLS
GLECYETSDLTWEDDEEEEEEEEEEDEDEDADISLEEIPVKQVKRVAPQKQMSIAKK
KKVEKEEDETVVRPSPQDKSPWKKEKSTPRAKKPVTKK"

Figure 6

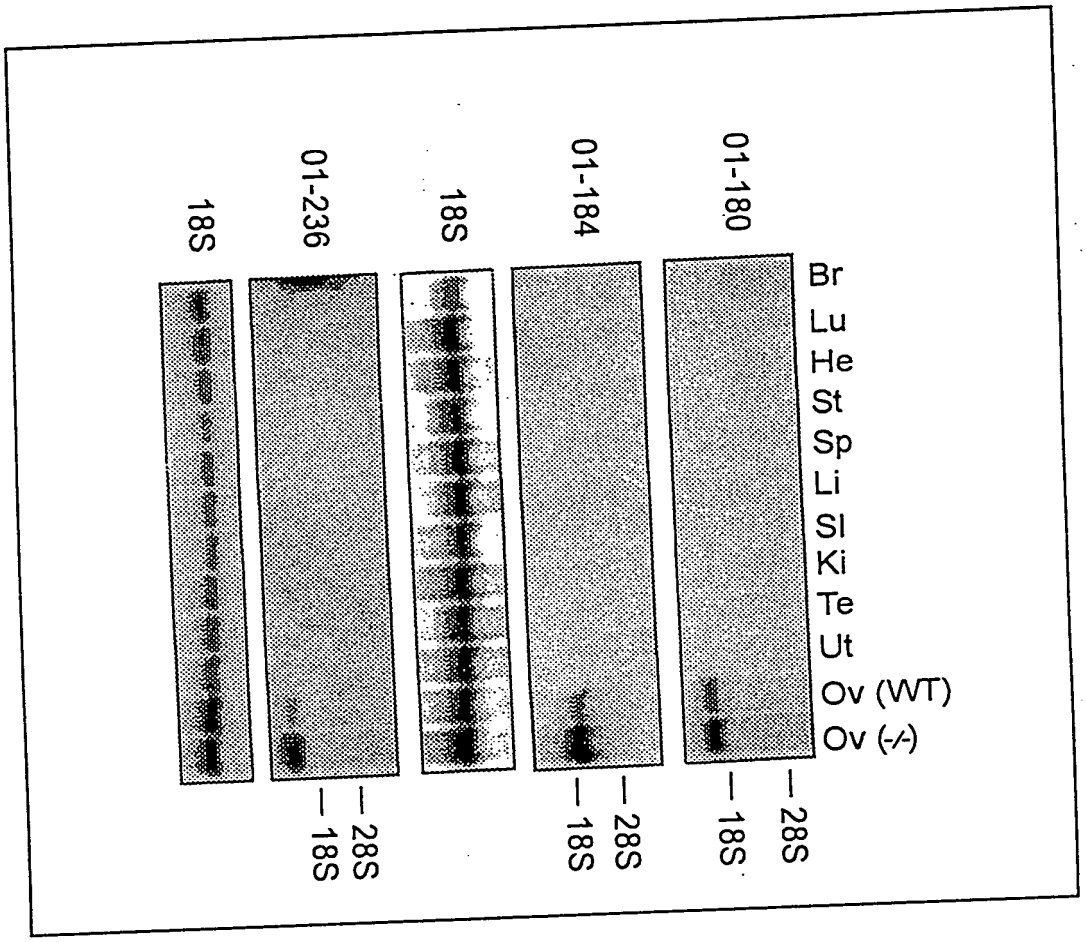

01-180
01-184
18S
01-236
18S
Br
Lu
He
St
Sp
Li
Sl
Ki
Te
Ut
Ov (WT)
Ov (-/-)
28S
18S
28S
18S
28S
18S

Figure 7

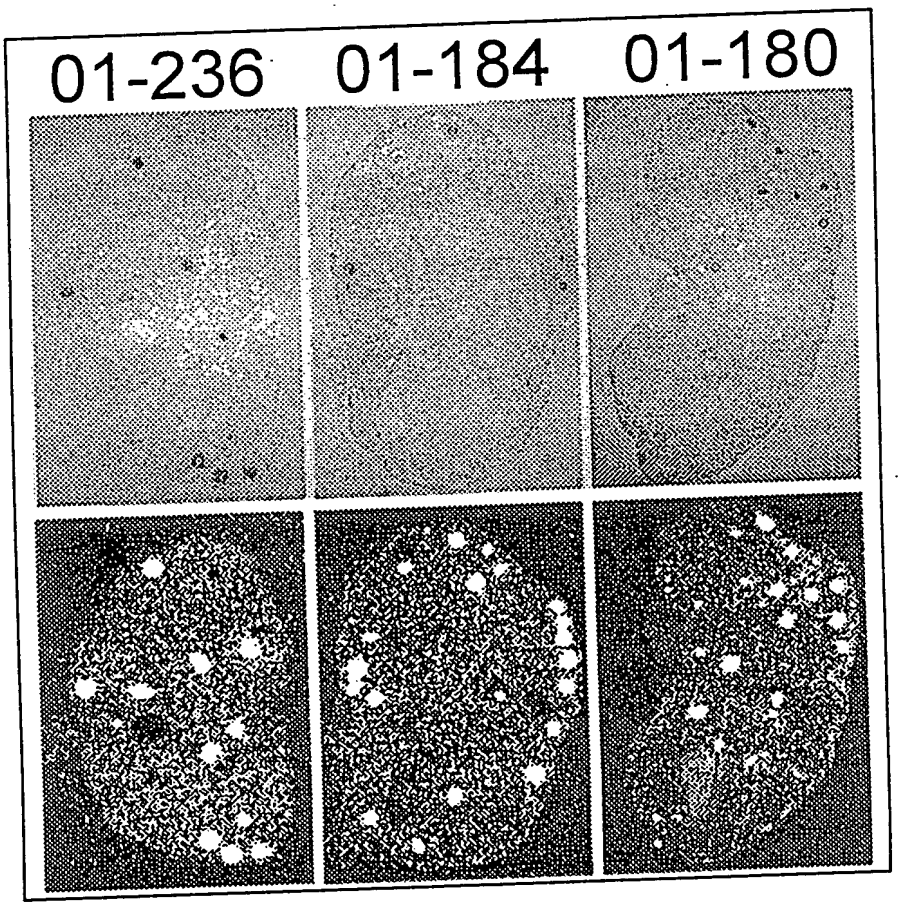


Figure 8

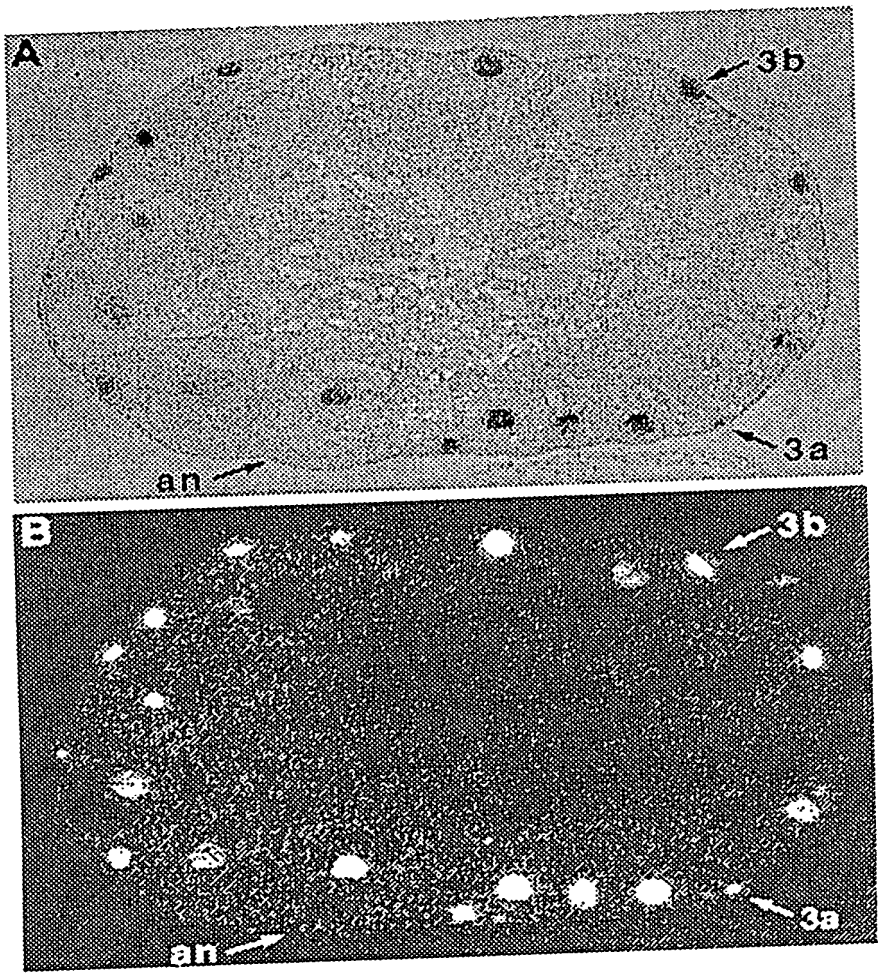


Figure 9

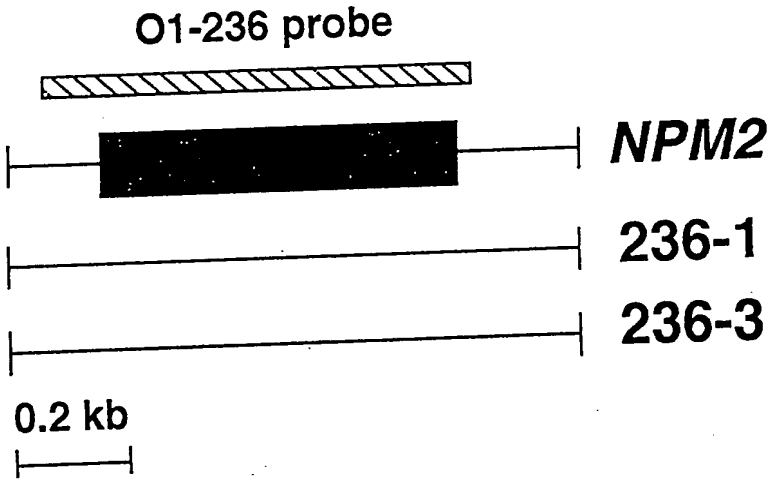
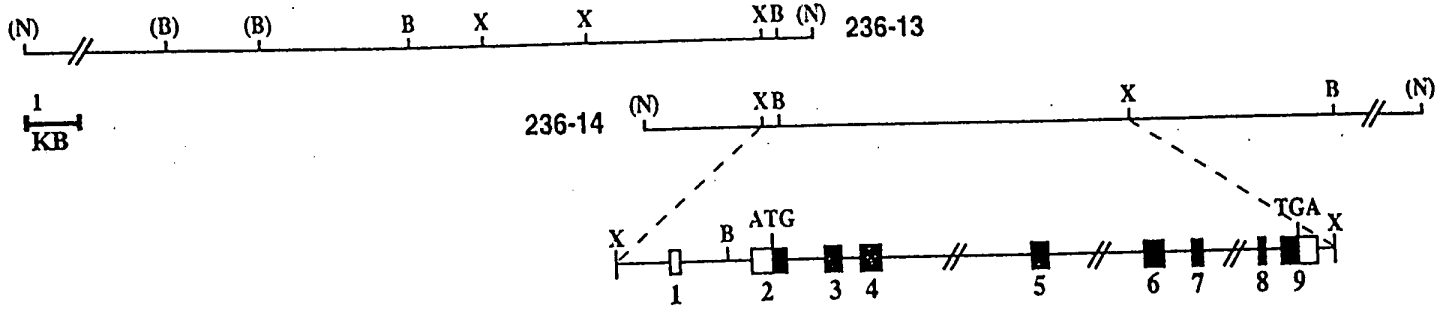


Figure 10


Npm2 MSRHSTSSVTETTAK--NMLWGSELN-QEKQTCTFRGQG-EKKDSCKLLL
Xnpm2 MA--STVSNTSKLEKPVSLIWGCELNEQDK-TFEFKVEDDEEKCEHQLAL
PKC
47 STICLGEKAKEEVNRVEVLSQE-GRKPPITIATLKASVLPMVTVSGIELS
48 RTVCLGDKAKDEFNIVEIVTQEEGAEKSVPIATLKPSILPMATMVGIELT
PKC
CK2
96 PPVTFRLRTGSGPVFLSGLECYETSDLTWEDDEEEEEEEEEDEDEDADI
98 PPVTFRLKAGSGPLYISGQHVAMEEDYSWAEEDEGEAEGEEEEEEEED
CK2
146 SLEEIPVKQVKRVAPQKQMSIAKKKKVEKEEDETVVRPSPQDKSPWKKEK
147 --QESPPKAVKRPAATKKAGQAKKKKLDKE-DE-----SSEEDSPTKKGK
196 STPRAKKPVTKK 207
189 GAGRGRKPAAKK 200

Figure 11



EXON 1	49BP	INTRON 1	343BP
EXON 2	164BP	INTRON 2	134BP
EXON 3	86BP	INTRON 3	92BP
EXON 4	114BP	INTRON 4	2.8KB
EXON 5	94BP	INTRON 5	1.4KB
EXON 6	152BP	INTRON 6	186BP
EXON 7	41BP	INTRON 7	0.5KB
EXON 8	34BP	INTRON 8	92BP
EXON 9	250BP		

Figure 12

Mouse *Npm2* Gene Sequences

```
acagcagaggtgatgctcagaaatcaagttttaacagagggccaggtg
cttctagagtaggaggggattgcacacctccccacccccctcctctttc
ccaggcttcttaacagcctgctgtgggaagctgacccttagatggagc
cctgaaGCCATATTGAGGACCTGCAGTAGAGGTGGAACCCATGACTGG
CAGCGCAgtaagcttgagcagg... intron 1= 343bp
...ctttgcattactcagAACACAGTGATAACAGCTGAGCTCCAAGCA
AGGACCCAGGACCTTGCCTCACCACAGACATAATCTTTCCCCACAACA
CCTCCACCAAGCCGCCCTGTAAATCGAC    ATG AGT CGC CAC AGC
                                    M   S   R   H   S
1

ACC AGC AGC GTG ACC GAA ACC ACA GCA AAA AAC ATG
 T   S   S   V   T   E   T   T   A   K   N   M
6

CTC TGG Ggtaagggctaaggct... intron 2 = 134bp
 L   W
18

...gtcttcgctgtgcagGT AGT GAA CTC AAT CAG GAA AAG
              G   S   E   L   N   Q   E   K
20

CAG ACT TGC ACC TTT AGA GGC CAA TGC GAG AAG AAG
 Q   T   C   T   F   R   G   Q   C   E   K   K
28

GAC AGC TGT AAA CTC TTG CTC AGC ACGgtgggtgtctccc
 D   S   C   K   L   L   L   S   T
40

aa... intron 3 = 92bp ...catcacctttctcagATC
                                      I
49

TGC CTG GGG GAG AAA GCC AAA GAG GAG GTG AAC CGT
 C   L   G   E   K   A   K   E   E   V   N   R
50

GTG GAA GTC CTC TCC CAG GAA GGC AGA AAA CCA CCA
 V   E   V   L   S   Q   E   G   R   K   P   P
62

ATC ACT ATT GCT ACG CTG AAG GCA TCA GTC CTG CCC
 I   T   I   A   T   L   K   A   S   V   L   P
74

ATGgtgagtcttctctcc... intron 4 = 2.8kb ...agaa
 M
86

gggggacacagGTC ACT GTG TCA GGT ATA GAG CTT TCT
              V   T   V   S   G   I   E   L   S
87

CCT CCA GTA ACT TTT CGG CTC AGG ACT GGC TCA GGA
 P   P   V   T   F   R   L   R   T   G   S   G
96
```

Figure 13A

```
        CCT GTG TTC CTC AGT GGC CTG GAA TGT TAT Ggtaagtt
108       P   V   F   L   S   G   L   E   C   Y

        gtagccta... intron 5 = 1.35kb ...ggctacccattcc

        agAG ACT TCG GAC CTG ACC TGG GAA GAT GAC GAG GAA
118       E   T   S   D   L   T   W   E   D   D   E   E

        GAG GAG GAA GAG GAG GAG GAA GAG GAT GAA GAT GAG
130       E   E   E   E   E   E   E   E   D   E   D   E

        GAT GCA GAT ATA TCG CTA GAG GAG ATA CCT GTC AAA
142       D   A   D   I   S   L   E   E   I   P   V   K

        CAA GTC AAA AGG GTG GCT CCC CAG AAG CAG ATG AGC
154       Q   V   K   R   V   A   P   Q   K   Q   M   S

        ATA GCA AAGgtgggggggaaaagaa... intron 6 = 186bp
166       I   A   K

        ...tggtttttgttccagAAA AAG AAG GTG GAA AAA GAA
169                       K   K   K   V   E   K   E

        GAG GAT GAA ACA GTA GTG AGgtaattcatgcagtt...
176       E   D   E   T   V   V   R

        intron 7 = 0.5kb ... ctattccctttccagG CCC AGC
183                                          P   S

        CCT CAG GAC AAG AGT CCC TGG AAG AAG gtgagcaataag
185       P   Q   D   K   S   P   W   K   K

        aag... intron 8 = 92bp ...ctcttatctgcacagGAG
194                                          E

        AAA TCT ACA CCC AGA GCA AAG AAG CCA GTG ACC AAG
195       K   S   T   P   R   A   K   K   P   V   T   K

        AAA TGA CCTCATCTTAGCATCTTCTGCGTCCAAGGCAGGATGTCCA
207       K   *

        GCAGCTGTGTTCTGGTGCAGGTGTCCAGCCCCACCACCCTAGTCTGAA
        TGTAATAAGGTGGTGTGGCTGTAACCCTGTAACCCAGCCCTCCAGTTT
        CCGGAGGTTTTTGGTGAAGAGCCCCCAGCAAGTTCGCCTAGGGCCACA
        ATAAAATTTGCATGATCAGGacctccctctgcctccccctccctggat
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        acgagcaagaaaccagccccatgt
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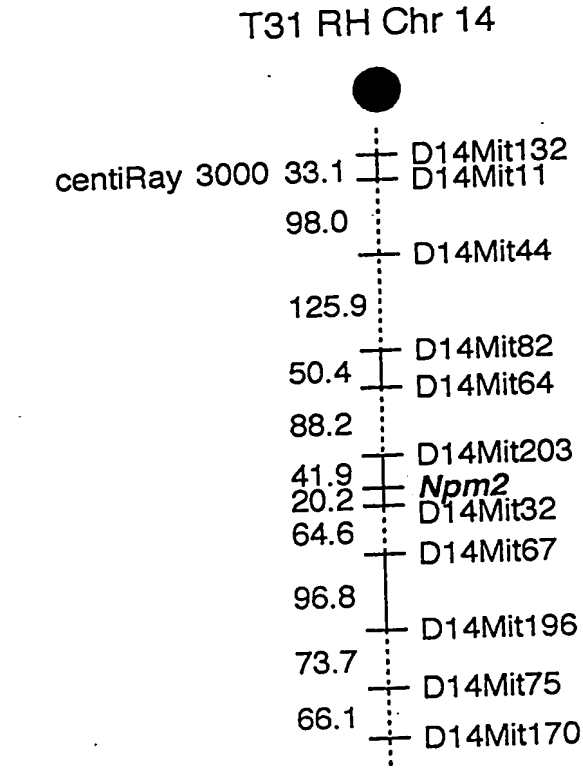
Figure 13B


T31 RH Chr 14
centiRay 3000
33.1
D14Mit132
D14Mit11
98.0
D14Mit44
125.9
D14Mit82
50.4
D14Mit64
88.2
D14Mit203
41.9
Npm2
20.2
D14Mit32
64.6
D14Mit67
96.8
D14Mit196
73.7
D14Mit75
66.1
D14Mit170

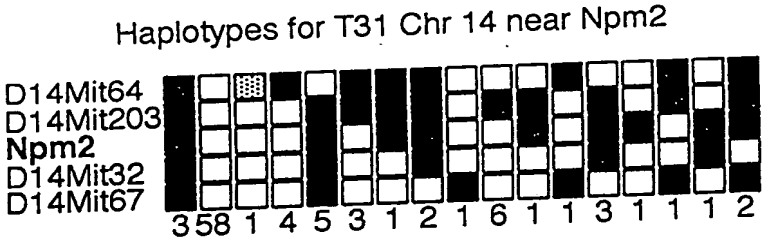

Haplotypes for T31 Chr 14 near Npm2
D14Mit64
D14Mit203
Npm2
D14Mit32
D14Mit67
3 5 8 1 4 5 3 1 2 1 6 1 1 3 1 1 1 2

Figure 14

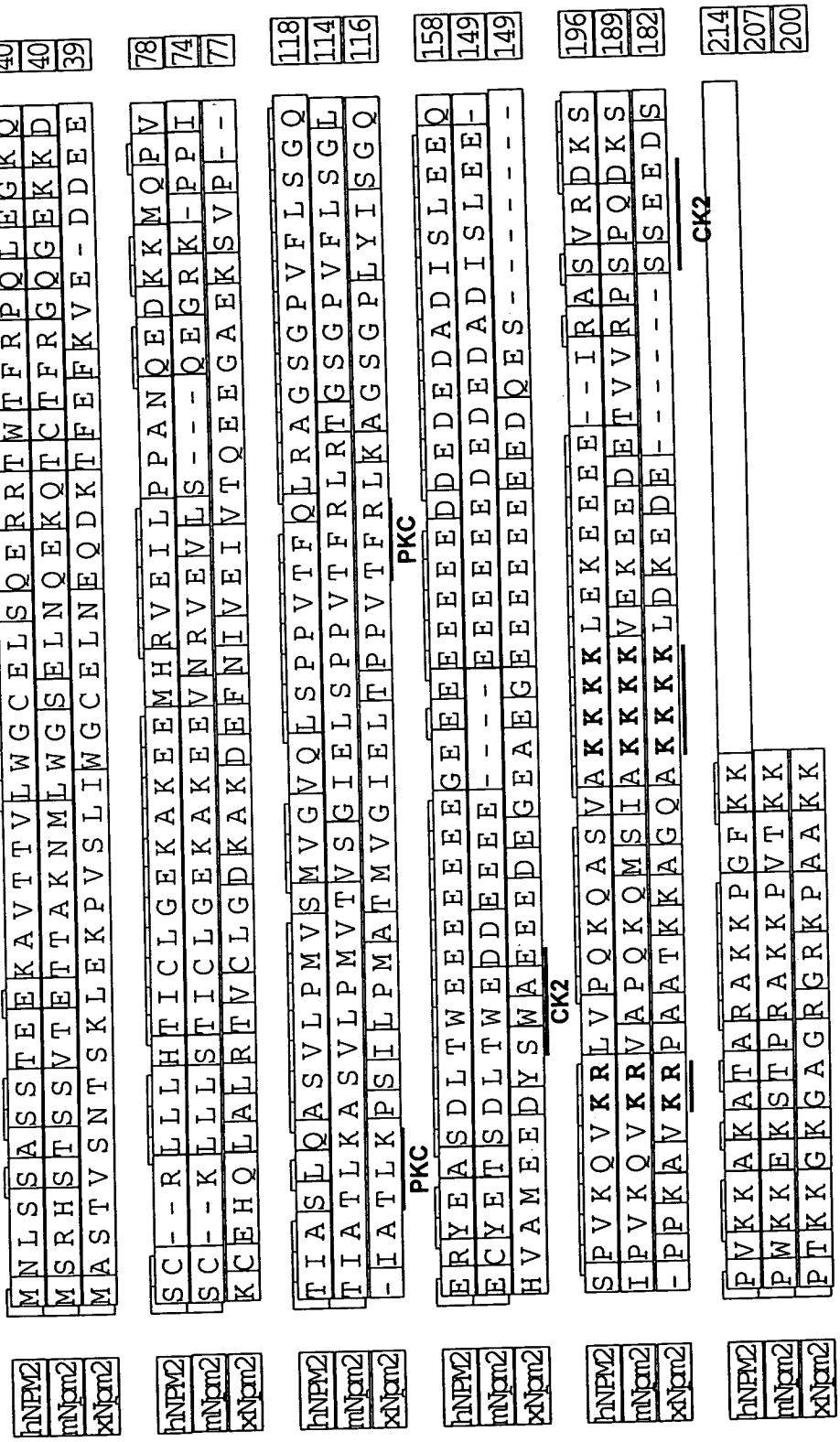


FIGURE 15

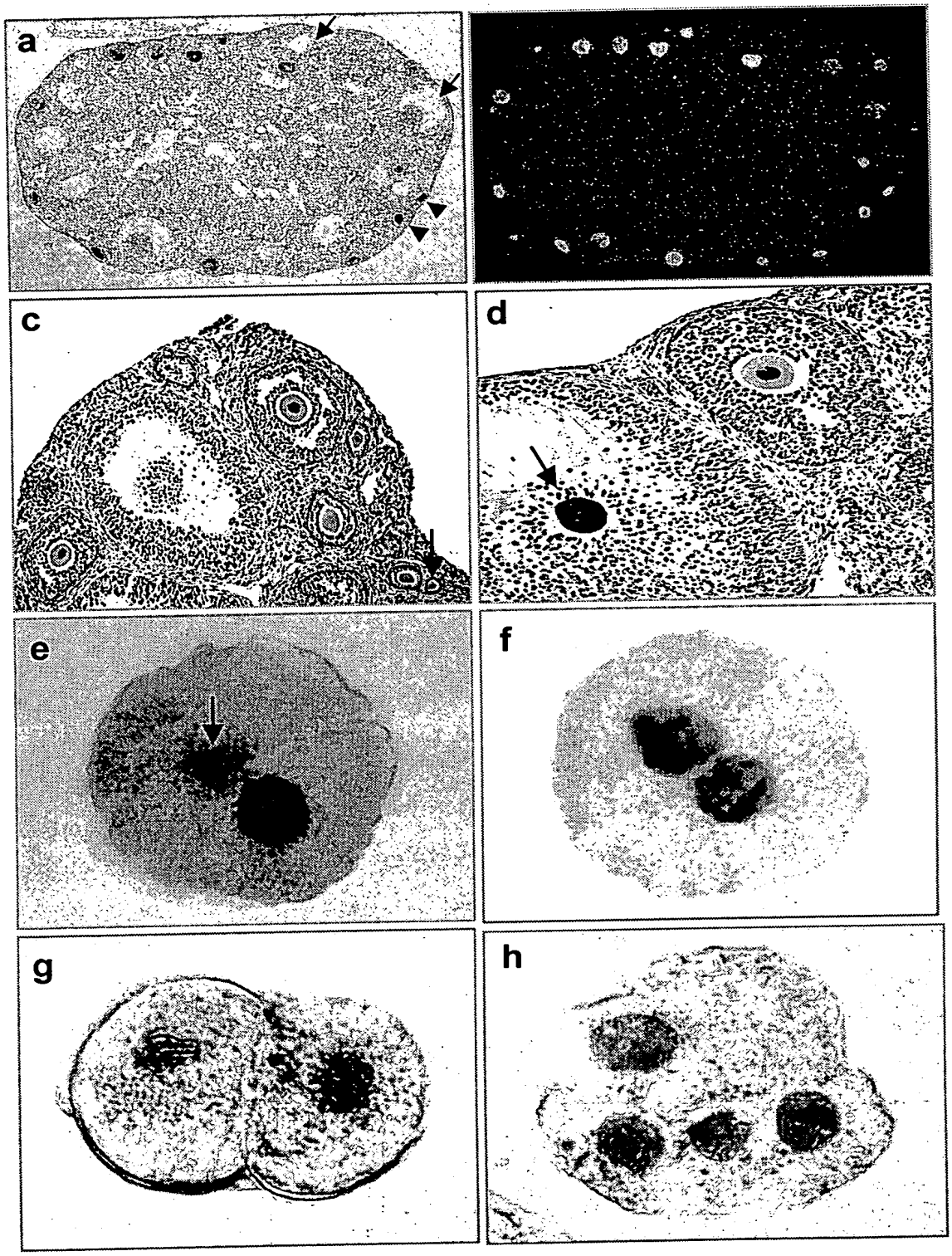
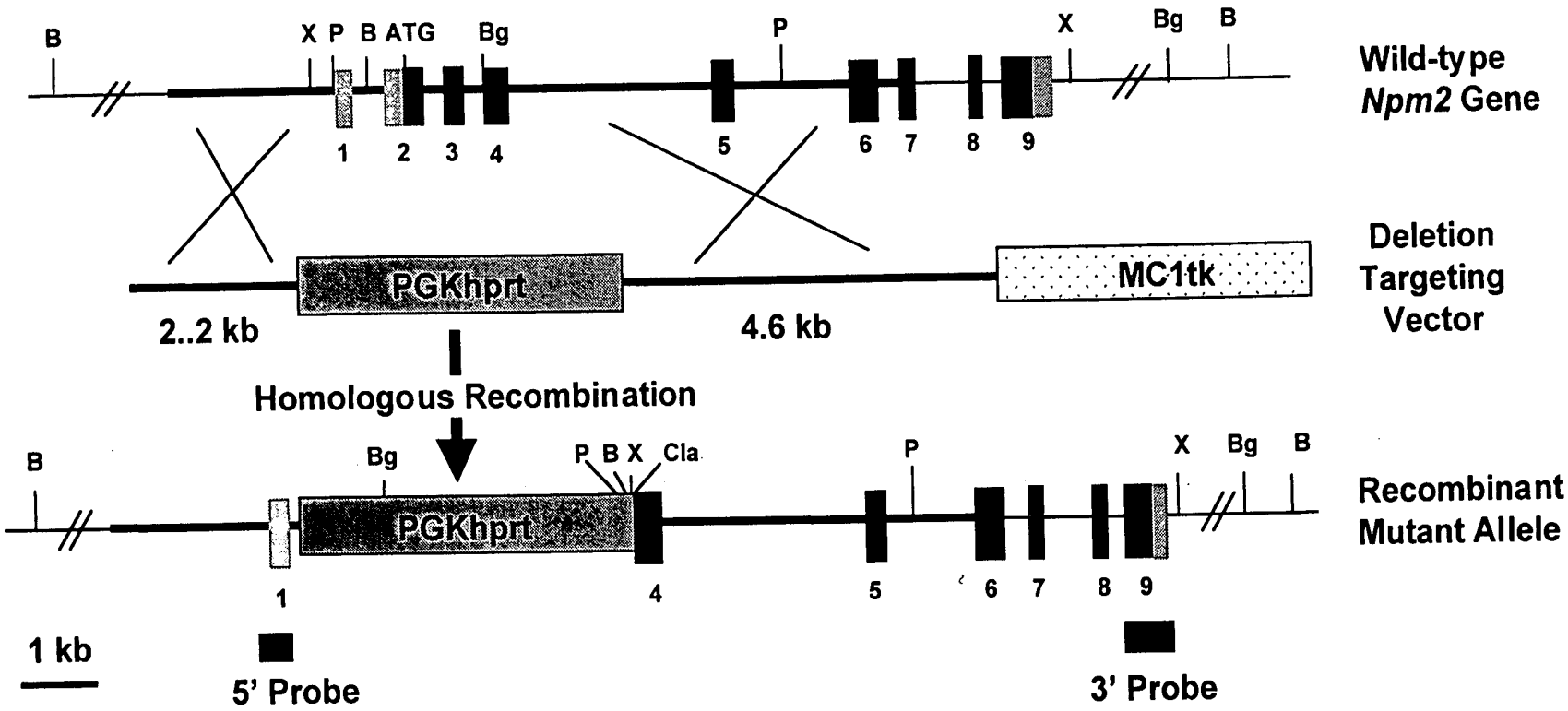


FIGURE 16



	5' Probe	BamH1 Digest	3' Probe	BglII Digest
Wild-Type		7.1 kb		7.5 kb
Recombinant		10.7 kb		10.3 kb

FIGURE 17a

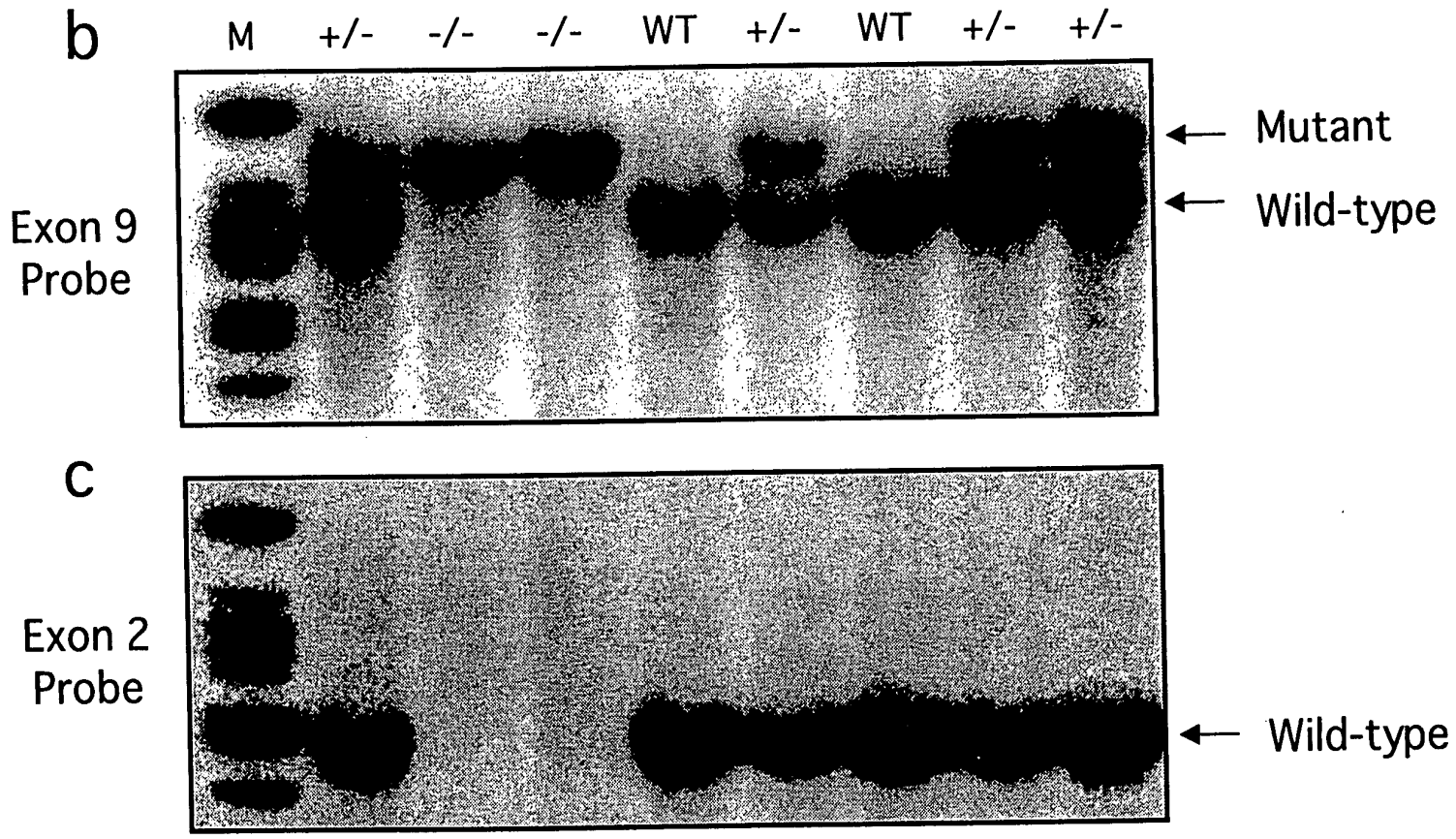


Figure 17b - Figure 17c

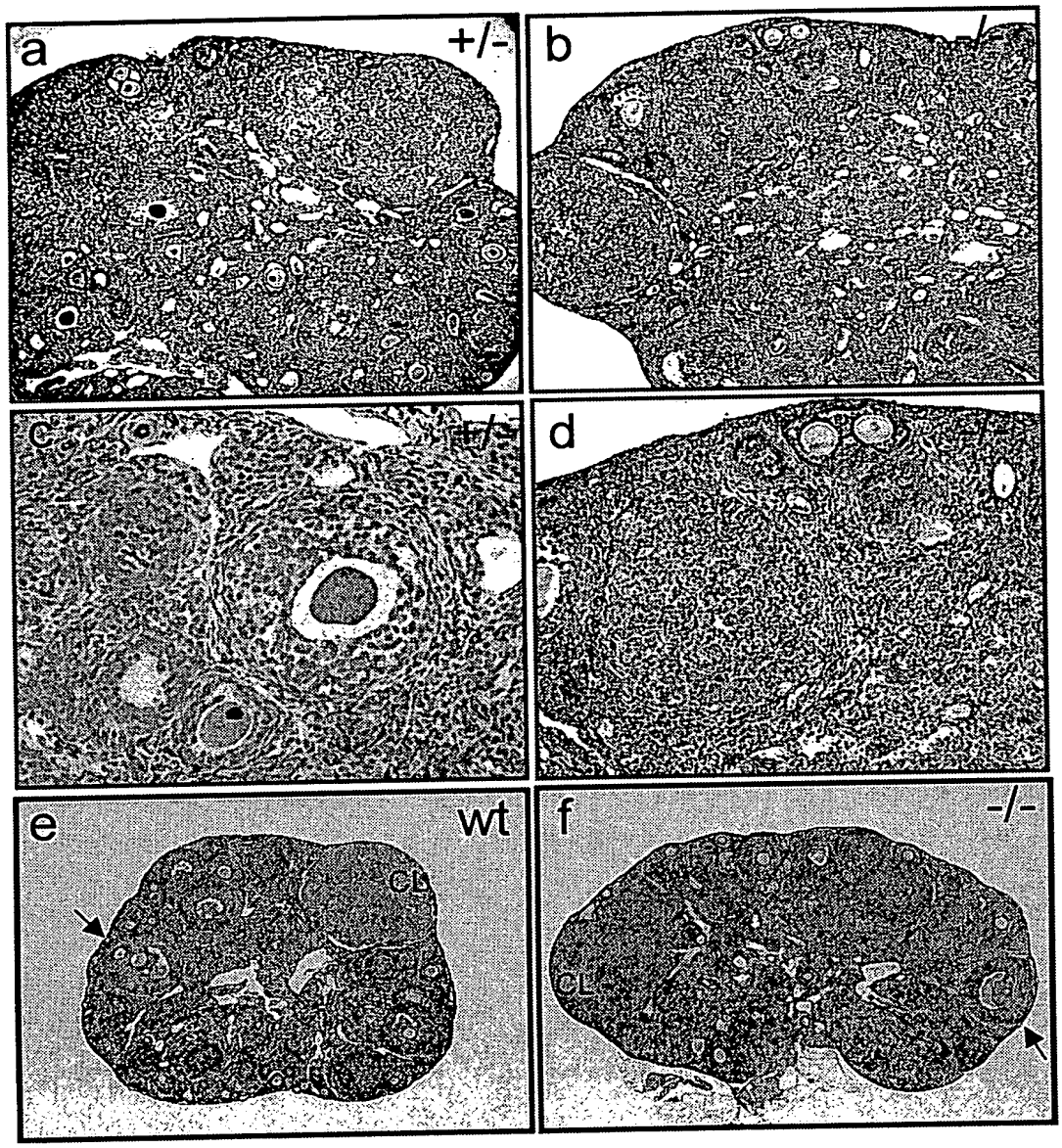


Figure 18

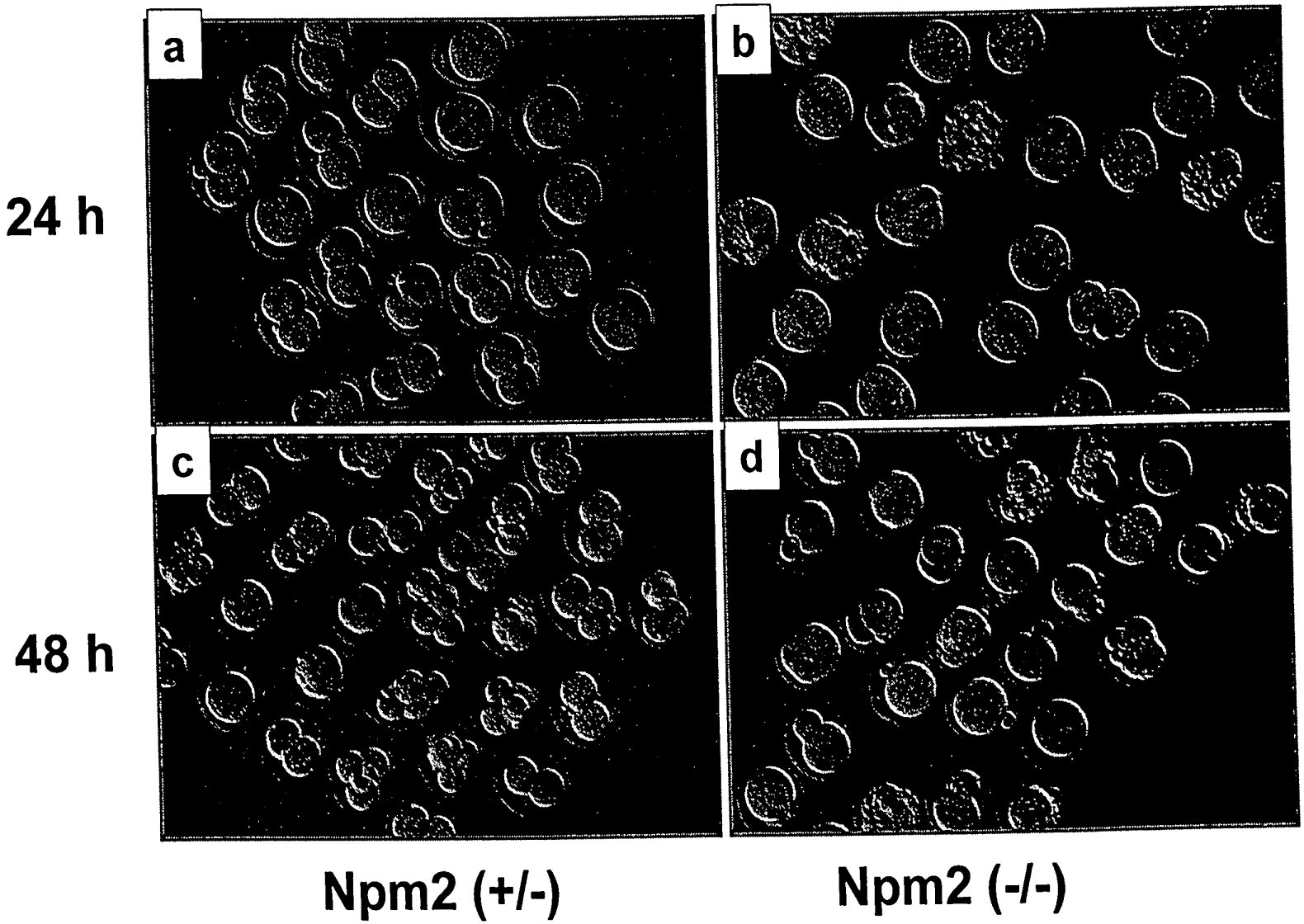


Figure 19a - 19d

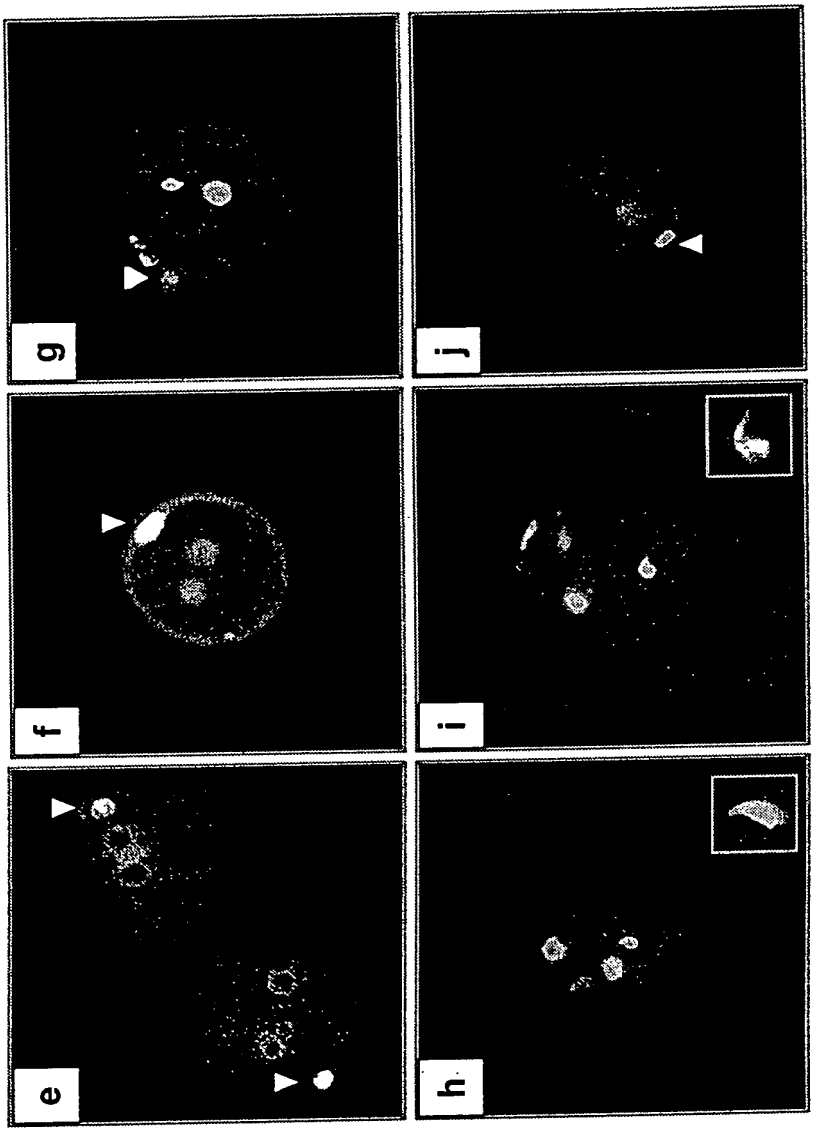


Figure 19e - 19j

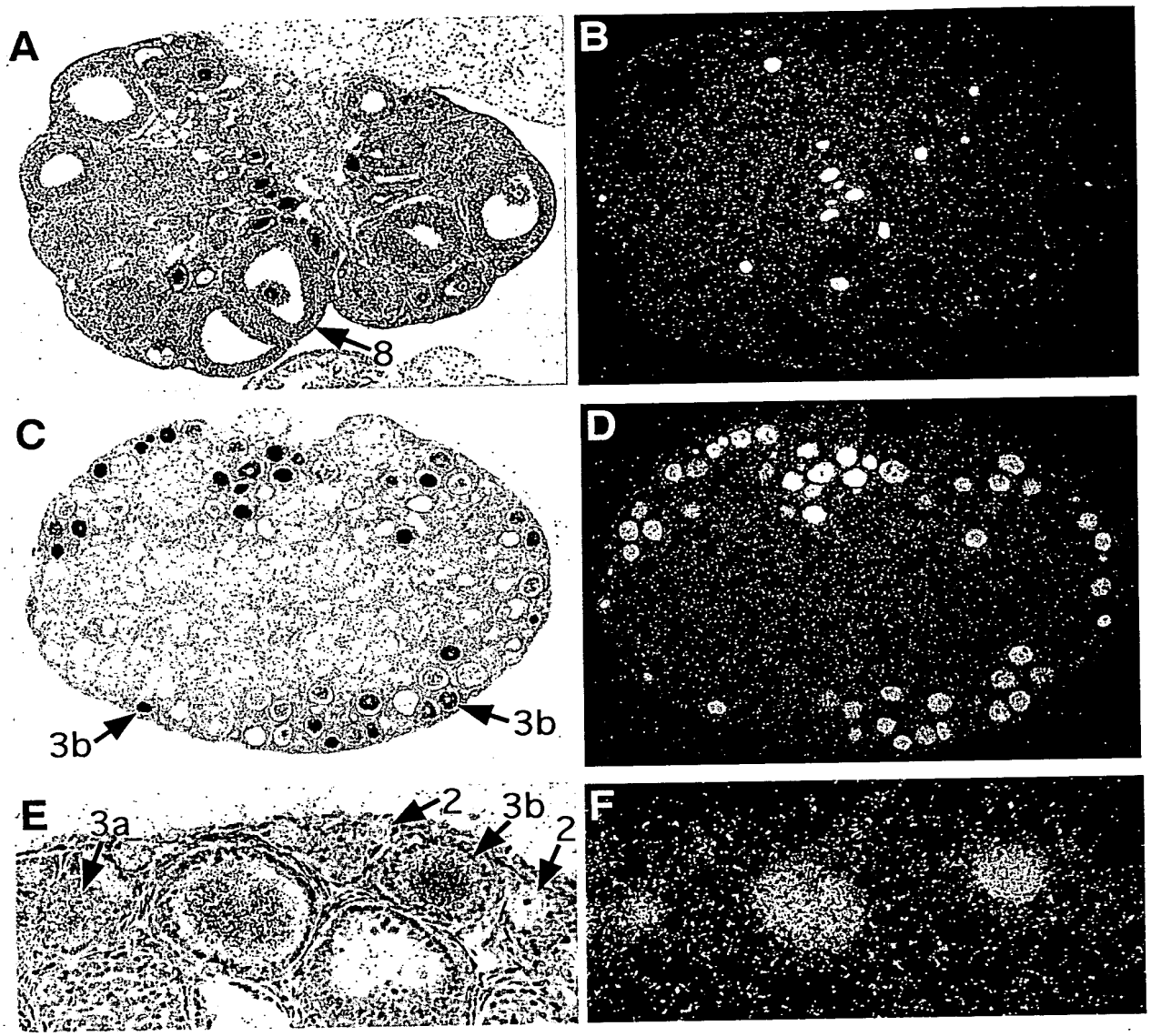


Figure 20

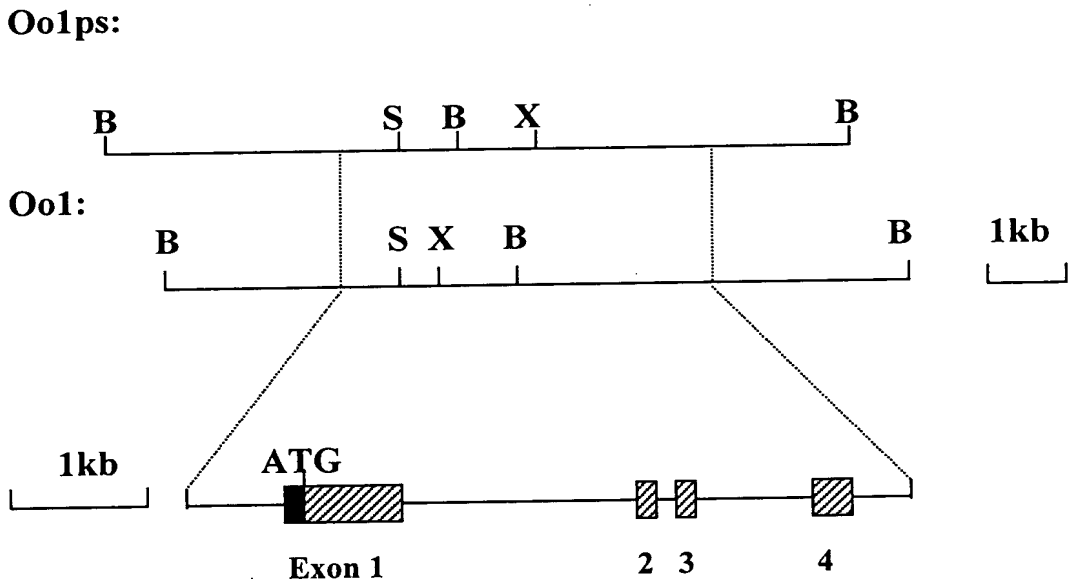


Figure 21

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Oo1    gene GGCGGGCGAGGCGCGGGACGCACCCATGTTCCCGGCGAGCACGTTCCACCCCTGCCCGCATCCTTATCCG   70
psOo1  gene GGCGGGCGAGGCGCGGGACGCACCCATGTTCCCGGCGAGCACGTTCCACCCCTGCCCGCATCCTTATCCG

Oo1    gene CAGGCCACCAAAGCCGGGGATGGCTGGAGGTTCGGAGCCAGGGGCTGCCGACCCGCGCCCCCCTCCTTCC  140
psOo1  gene CAGGCCACCAAAGCCGGGGATGGCTGGAGGTTCGGAGCCAGGGGCTGCCGACCCGCGCCCCCCTCCTTCC

Oo1    gene TCCCCGGCTACAGACAGCTCATGGCCGCGGAGTACGTCGACAGCCACCAGCGGGCACAGCTCATGGCCCT  210
psOo1  gene TCCCCGGCTACAGACAGCTCATGGCCGCGGAGTACGTCGACAGCCACCAGCGGGCACAGCTCATGGCCCT

Oo1    gene GCTGTCGCGGATGGGTCCCCGGTCGGTCAGCAGCCGTGACGCTGCGGTGCAGGTGAACCCGCGCCGCGAC  280
psOo1  gene GCTGTCGCGGATGGGTCCCCGGTCGGTCAGCAGCCGTGACGCTGCGGTGCAGGTGAACCCGCGCCGCGAC

Oo1    gene GCCTCGGTGCAGTGTTCACTCGGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCC  350
psOo1  gene GCCTCGGTGCAGTGTTCACTCGGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCC

Oo1    gene GATCGGGTTCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCGCGATCCTGGCAGACCGTAGC  420
psOo1  gene GGTCGGGTTCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCGCGATCCTGGCAGACCGTAGC

Oo1    gene CCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTCACTGGAGGTTGCGGGAGGCAGGCAGACACCC  490
psOo1  gene CCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTCACTGGAGGTTGCGGGAGGCAGGCAGACACCC

Oo1    gene ACGAAGGGAGAGGGGAGCCCGGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGCGAGGA  560
psOo1  gene ACGAAGGGAGAGGGGAGCCCGGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGTGAGGA

Oo1    gene AAGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGATGTTCAGGCTGCAGGGCAGGCCGGGTGGGAGCAGCA  630
psOo1  gene AAGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGACGTTCAGGCTGCAGGGCAGGCCGGGTGGGAGCAGCA

Oo1    gene GCCACCACCGGAGGACCGGAACAGTGTGGCGGCGATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCCT  700
psOo1  gene GCCACCACCGGAGGACCGGAACAGTGTGGCGGCGATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCCT

Oo1    gene GCCGCAGAGATGGCTCAGGACCCCGGTGATTCGGATGCCCCTCGAGACCAGGCCTCCCCGCAAAGCACGG  770
psOo1  gene GCCGCAGAGATGGCTCAGGACCCCGGTGATTCGGATGCCCCTC----------CCCGCAAAGCACCA

Oo1    gene AGCAGGACAAGGAGCGCCTGCGTTTCCAGgtgaggccagcctga...intron 1 (1.8kb)... taccctgc  799
psOo1  gene AGCAGGACAAGGAGCTCCTGCGTTTCCAGgtgaggccagcctgg...intron 1 (1.8kb)... taccctgc

Oo1    gene tgttcagTTCTTAGAGCAGAAGTACGGCTACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCT  863
psOo1  gene tgttcagTTCTTAGAGCAGAAGTACGGCTACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCT

Oo1    gene ATGTGTGGTGTGTGCAGGGCACCAGTAAGgtaagagacaccgtg...intron 2 (78bp)... tctttctcct  892
psOo1  gene ATGTGTGGTGTGTGCAGGGCACCAGTAAGgtaagagacaccgtg...intron 2 (78bp)... tctttctcct

Oo1    gene cgcagGTGTACTTCAAACAGTTCTGCCGAGTGTGTGAGAAATCCTACAACCCTTACAGAGTGGAGGACAT  957
psOo1  gene cgtag GTGTACTTCAAACAGTTCTGCCGAGTGTGTGAGAAATCCTACAACCCTTACAGAGTGGAGGACGT

Oo1    gene CACCTGTCAAgtaaaccaaacgttt...intron 3 (878bp)...actccgatttttcagAGTTGTAAAAGAACT  982
psOo1  gene CACCTGTCAAgtaaaccaaacgttt...intron 3 (878bp)...gctctgagttttcagAGTTGTAAAGGAACT
```

Figure 22a

```
Oo1    gene AGATGTGCCTGCCCAGTCAGACTTCGCCACGTGGACCCTAAACGCCCCCATCGGCAAGACTTGTGTGGGA 1052
psOo1  gene AGATGTGCCTGCCCAGTCAGACCTCGCCACGTGTACCTTAGACGCCCCCATCAGCAAGACTTGTGTGAGA

Oo1    gene GATGCAAGGACAAATGCTTGTCCTGCGACAGCACCTTCAGCTTCAAATACATCATTTAGTGAGAGTACGA 1122
psOo1  gene GATGCAAGGACAAACGCCTGTCCTGCGACAGCACCGTCAGCTTCAAATACATGATTTAGTGAGAGTCGAA

Oo1    gene AACGTTTCTGCTAGATGGGGCTAATGGAATGGACAAGTGAGCTTTCTCCCCCTCTTCCCTCTTCCCATTTC 1192
psOo1  gene AACGTTTCTGCTAGATGGGGCTAATGGAATGGACAAGTGAGCTTTCTCCCCCTCTTCACCTCTTCCCTTTC

Oo1    gene CAAATTCTTCATGACAGACAGTGTTACTTGGATATAAAGCCTGTGAATAAAAGGTATTGCAAACA       1257
psOo1  gene CAAATTCTTCATGACAGACAGTGTTACTTGGATATAAAGCCTGTGAATAAAAGGTATTGCAAACA
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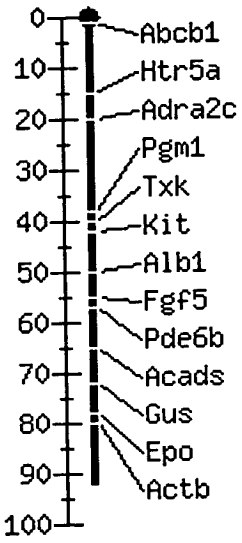
Figure 22b

A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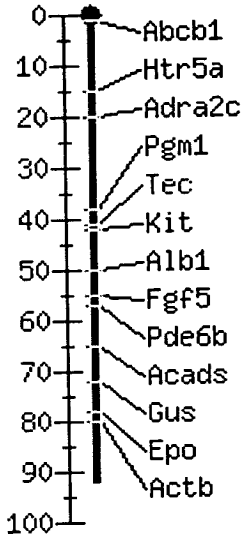
B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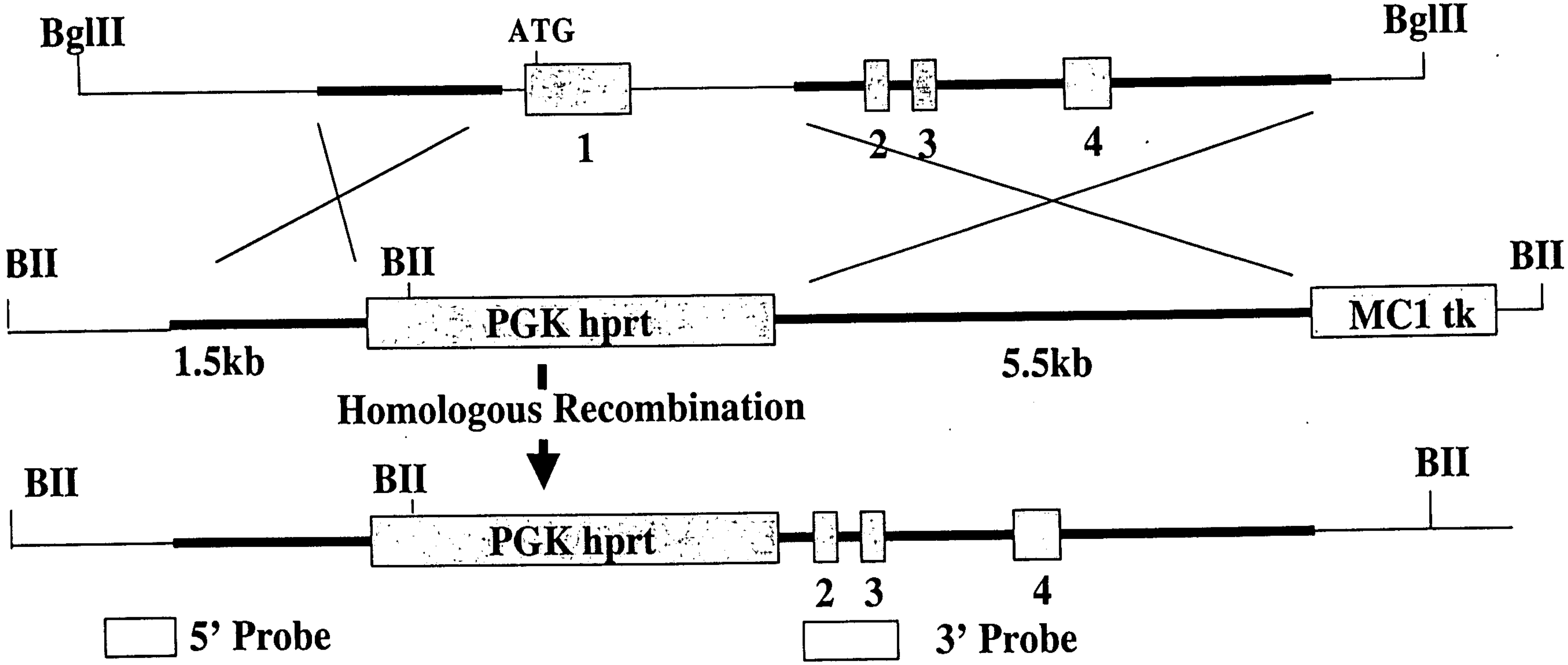
Htr5a
Adra2c
Pgm1
Tec
Kit
Alb1
Fgf5
Pde6b
Acads
Gus
Epo
Actb

Figure 23

Oo1 Gene Targeting Strategy



5'Probe	Bgl II Digest
WT	16.5 kb
MUT	8.8 kb

3'Probe	Bgl II Digest
WT	16.5 kb
MUT	9.0 kb

Figure 24

Human NPM2 cDNA sequence: 924bp

CAGCCCGCTT CTCTGCCCGG AGCCATGAAT CTCAGTAGCG
CCAGTAGCAC GGAGGAAAAG GCAGTGACGA CCGTGCTCTG
GGGCTGCGAG CTCAGTCAGG AGAGGCGGAC TTGGACCTTC
AGACCCCAGC TGGAGGGGAA GCAGAGCTGC AGGCTGTTGC
TTCATACGAT TTGCTTGGGG GAGAAAGCCA AAGAGGAGAT
GCATCGCGTG GAGATCCTGC CCCCAGCAAA CCAGGAGGAC
AAGAAGATGC AGCCGGTCAC CATTGCCTCA CTCCAGGCCT
CAGTCCTCCC CATGGTCTCC ATGGTAGGAG TGCAGCTTTC
TCCCCCAGTT ACTTTCCAGC TCCGGGCTGG CTCAGGACCC
GTGTTCCTCA GTGGCCAGGA ACGTTATGAA GCATCAGACC
TAACCTGGGA GGAGGAGGAG GAAGAAGAAG GGGAGGAGGA
GGAAGAGGAA GAGGAAGATG ATGAGGATGA GGATGCAGAT
ATATCTCTGG AGGAGCAAAG CCCTGTCAAA CAAGTCAAAA
GGCTGGTGCC CCAGAAGCAG GCGAGCGTGG CTAAGAAAAA
AAAGCTGGAA AAAGAAGAAG AGGAAATAAG AGCCAGCGTT
AGAGACAAGA GCCCTGTGAA AAAGGCCAAA GCCACAGCCA
GAGCCAAGAA GCCAGGATTC AAGAAATGAG GAGCCACGCC
TTGGGGGGCA CGGTGCAAAG TGGGCCTTCC CTGGGCTGTG
CTGCAGGCAC AGGGTGCCCC TGTCCAGCCC CTCCACCTGT
GTCTGAATGC AACAGGGGTG TTGCGGGGGC AACATGAGAG
CCCCTCACCC CCAACTCTCC ACTTTCAGGA GGCCCCCAGT
GAAGAGCCCC ACCTCGGGGT CACAATAAAG TTGCCTGGTC
AGGAAAAAAA AAAAAAAAAA AACGTTTGCG GCCGCAAGCT
TATG

Human NPM2 Amino Acid sequence: 214aa

MNLSSASSTE EKAVTTVLWG CELSQERRTW TFRPQLEGKQ
SCRLLLHTIC LGEKAKEEMH RVEILPPANQ EDKKMQPVTI
ASLQASVLPM VSMVGVQLSP PVTFQLRAGS GPVFLSGQER
YEASDLTWEE EEEEEGEEEE EEEEDDEDED ADISLEEQSP
VKQVKRLVPQ KQASVAKKKK LEKEEEEIRA SVRDKSPVKK
AKATARAKKP GFKK

Figure 25